Lab 06 (stat)

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Question 1:To test the claim that the resistance of an electric wire can be reduced by more than 0.050 ohm by alloying,32 values obtained for standard wire yielded π = 0.136ohm (sample mean) and sd1 = 0.004 ohm and 32 values obtained for alloyed wire yielded $\bar{y}$ = 0.083 ohm and sd2 = 0.005 ohm. At the 0.05 level of significance, does this support the claim? Evaluate the 90% confidence interval of difference between means? [Hint: generate the two sample using rnorm function]

H0:mu1-mu2=0.05 H1:mu1-mu2!=0.05

```
x<-rnorm(32,mean=0.136,sd=0.004)
y<-rnorm(32,mean=0.083,sd=0.005)

?t.test

## starting httpd help server ... done

t.test(x,y,mu=0.05,alternative = "two.sided",var.equal = F)

##
##  Welch Two Sample t-test
##
## data:  x and y
## t = 2.4192, df = 55.076, p-value = 0.01889
## alternative hypothesis: true difference in means is not equal to 0.05
## 95 percent confidence interval:
##  0.05050595 0.05539010
## sample estimates:
##  mean of x  mean of y
## 0.13597121 0.08302318

Conclusion: Here p value is less than alpha .so we reject the null
hypothesis.Therefore,mu1-mu2!=0.05
```

Question 2: Given the marks of 30 students for a test conducted before and after an online course. Test whether the course was effective or not.

```
library(readxl)
marks_data <- read_excel("C:/Users/PRASANTA/Downloads/marks data.xlsx")
View(marks_data)

colnames(marks_data)

## [1] "Test 1" "Test 2"
```

```
x<-marks_data$`Test 1`
x
```

```
##  [1]  8.0  5.0  8.0  7.0  4.0  4.0  5.0  3.0 10.0  6.0  5.0  5.0  2.0  3.0
5.0
## [16]  4.0  5.0  5.0  2.5  5.0  6.5  4.0  6.5  3.0  5.0  1.0  5.0  6.0  4.0
```

```
y<-marks_data$`Test 2`
y
```

```
##  [1] 4 7 6 7 6 6 7 3 7 7 7 7 6 4 6 6 7 5 7 5 3 3 6 5 6 5 5 6 5
```

d=difference of marks of students before and after taking the course H0:mean(d)=0
H1:mean(d)!0

```
x=marks_data$`Test 1`
y=marks_data$`Test 2`
t.test(x,y,paired=TRUE,alternative = "two.sided",conf.level = 0.95)
```

```
##
##  Paired t-test
##
## data:  x and y
## t = -1.9301, df = 28, p-value = 0.06379
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  -1.52821749  0.04545887
## sample estimates:
## mean difference
##      -0.7413793
```

```
Conclusion: Here p value is greater than alpha. So,here we accept the null
hypothesis. Therefore, the course was effective.
```